WHAT IS CLAIMED IS:

1 An evaluation apparatus, comprising:

an AC input signal superimposing circuit for superimposing an AC input signal to a gate of a MOSFET (Metal Oxide Semiconductor Field Effect Transistor);

an AC component measurement circuit for measuring an AC component of a current flowing between a source and a drain of the MOSFET when the AC input signal is superimposed to the gate; and

a mutual conductance calculation circuit for calculating a mutual conductance at a frequency of the AC input signal of the MOSFET from a ratio of amplitude of an AC component of a measured current and amplitude of the AC input signal,

wherein the gate, the source, and the drain of the MOSFET are being applied a DC voltage.

2 An evaluation apparatus according to claim 1, wherein the MOSFET is a SOI (Silicon On Insulator) MOSFET having a SOI structure.

3 An evaluation apparatus according to claim 1, further comprising:

a drain current calculation circuit for calculating a drain current at around a frequency of the AC input signal by measuring the mutual conductance by sweeping a gate voltage and integrating the mutual conductance by the gate voltage.

4 An evaluation apparatus according to claim 2, further comprising:

an AC component amplitude calculation circuit for calculating an amplitude of an AC component of a body voltage under a condition of the AC

input signal being inputted from a ratio of a mutual conductance of the SOI MOSFET at a frequency of the AC input signal and a mutual conductance of the SOI MOSFET at DC without superimposing the AC input signal, and from a relation between the body voltage of the SOI MOSFET and a threshold value.

5 An evaluation apparatus according to claim 1, further comprising:

a circuit simulation unit for simulating the SOI MOSFET;

a comparator circuit for comparing a gate · source · drain voltage dependency of a frequency characteristic of the mutual conductance obtained from the mutual conductance calculation circuit as a result of measurement of the MOSFET with a gate · source · drain voltage dependency of a frequency characteristic of the mutual conductance obtained as a result of circuit simulation for simulating the MOSFET; and

a parameter control circuit for changing a parameter which is used for the circuit simulation so that a frequency characteristic of the mutual conductance obtained as a result of the circuit simulation approaches to a frequency characteristic of the mutual conductance obtained from a result of measurement of the MOSFET.

6 An evaluation apparatus according to claim 1, wherein a measurement of the mutual conductance is conducted under a bias condition that the gate voltage is within ±0.5 V of a threshold value of the MOSFET.

7 An evaluation apparatus according to claim 1, wherein the AC input signal superimposing circuit superimposes the AC input signal to the gate under a condition of applying the DC voltage to the substrate as well as the gate, the source, and the drain.

8 An evaluation apparatus, comprising:

an AC input signal superimposing circuit for superimposing an AC input signal to a drain of a SOI (Silicon On Insulator) MOSFET (Metal Oxide Semiconductor Field Effect Transistor);

an AC component measurement circuit for measuring an AC component of a current flowing between a source and a drain of the SOI MOSFET when the AC input signal is superimposed to the drain; and

a drain conductance calculation circuit for calculating a drain conductance at a frequency of the AC input signal of the SOI MOSFET from a ratio of amplitude of an AC component of a measured current and amplitude of the AC input signal,

wherein the gate, the source, and the drain of the SOI MOSFET are being applied a DC voltage.

9 An evaluation apparatus according to claim 8, further comprising:

an AC component amplitude calculation circuit for calculating amplitude of an AC component of a body voltage under a condition of the AC input signal being inputted from a ratio of a drain conductance at a frequency of the AC input signal and a drain conductance of the SOI MOSFET at DC without superimposing the AC input signal, and a relation between the body voltage of the SOI MOSFET and a threshold value.

10 An evaluation apparatus according to claim 8, further comprising:

a circuit simulation unit for simulating the SOI MOSFET;

a comparator circuit for comparing a gate · source · drain voltage dependency of a frequency characteristic of the drain conductance obtained from the drain conductance calculation circuit as a result of measurement of the

MOSFET with a gate • source • drain voltage dependency of a frequency characteristic of the drain conductance obtained as a result of circuit simulation for simulating the MOSFET; and

a parameter control circuit for changing a parameter which is used for the circuit simulation so that a frequency characteristic of the drain conductance obtained as a result of the circuit simulation approaches to a frequency characteristic of the drain conductance obtained from a result of measurement of the MOSFET.

11 An evaluation apparatus according to claim 8, wherein a measurement of the drain conductance is conducted under a bias condition that an absolute value of the gate voltage is within 0.5 V.

12 An evaluation apparatus according to claim 8, wherein the AC input signal superimposing circuit superimposes the AC input signal to the gate under a condition of applying the DC voltage to the substrate as well as the gate, the source, and the drain.

13 A circuit design method, comprising steps of:

a step for superimposing an AC input signal to a gate of a MOSFET (Metal Oxide Semiconductor Field Effect Transistor);

a step for measuring an AC component of a current flowing between a source and a drain of the MOSFET when the AC input signal is superimposed to the gate;

a step for calculating a mutual conductance at a frequency of the AC input signal of the MOSFET from a ratio of amplitude of an AC component of a measured current and amplitude of the AC input signal;

a step for comparing a gate · source · drain voltage dependency of a frequency characteristic of the mutual conductance obtained as a result of measurement of the MOSFET with a gate · source · drain voltage dependency of a frequency characteristic of the mutual conductance obtained from circuit simulation for simulating the MOSFET; and

a step for changing a parameter which is used for the circuit simulation so that a frequency characteristic of the mutual conductance obtained as a result of the circuit simulation approaches to a frequency characteristic of the mutual conductance obtained from a result of measurement of the MOSFET,
wherein the gate, the source, and the drain of the MOSFET are being applied a DC voltage.

14 A circuit design method according to claim 13, wherein the MOSFET is a SOI (Silicon On Insulator) MOSFET having a SOI structure.

15 A circuit design method according to claim 13, wherein the parameter is at least one of capacitances and resistors between a body of the MOSFET and the gate · source · drain · substrate.

16 A circuit design method according to claim 13, wherein the step for superimposing the AC input signal superimposes the AC input signal to the gate under a condition of applying the DC voltage to the substrate as well as the gate, the source, and the drain.

17 A circuit design method, comprising steps of:

a step for superimposing an AC input signal to a drain of a SOI (Silicon On Insulator) MOSFET (Metal Oxide Semiconductor Field Effect Transistor);

a step for measuring an AC component of a current flowing between a source and a drain of the SOI MOSFET when the AC input signal is superimposed to the drain;

a step for calculating a drain conductance at a frequency of the AC input signal of the SOI MOSFET from a ratio of amplitude of an AC component of a measured current and amplitude of the AC input signal;

a step for comparing a gate · source · drain voltage dependency of a frequency characteristic of the drain conductance obtained as a result of measurement of the MOSFET with a gate · source · drain voltage dependency of a frequency characteristic of the drain conductance obtained from circuit simulation for simulating the SOI MOSFET; and

a step for changing a parameter which is used for the circuit simulation so that a frequency characteristic of the drain conductance obtained as a result of the circuit simulation approaches to a frequency characteristic of the drain conductance obtained from a measurement result of the MOSFET,

wherein the gate, the source, and the drain of the SOI MOSFET are being applied a DC voltage.

18 A circuit design method according to claim 17, wherein the parameter is at least one of capacitances and resistors between a body of the SOI MOSFET and the gate · source · drain · substrate.

19 A circuit design method according to claim 17, wherein the step for superimposing the AC input signal superimposes the AC input signal to the gate under a condition of applying the DC voltage to the substrate as well as the gate, the source, and the drain.

20 A circuit design system, comprising:

a function block for superimposing an AC input signal to a gate of a MOSFET (Metal Oxide Semiconductor Field Effect Transistor);

a function block for measuring an AC component of a current flowing between a source and a drain of the MOSFET when the AC input signal is superimposed to the gate;

a function block for calculating a mutual conductance at a frequency of the AC input signal of the MOSFET from a ratio of amplitude of an AC component of a measured current and amplitude of the AC input signal;

a function block for comparing a gate · source · drain voltage dependency of a frequency characteristic of the mutual conductance obtained as a result of measurement of the MOSFET with a gate · source · drain voltage dependency of a frequency characteristic of the mutual conductance obtained from circuit simulation for simulating the MOSFET; and

a function block for changing a parameter which is used for the circuit simulation so that a frequency characteristic of the mutual conductance obtained as a result of the circuit simulation approaches to a frequency characteristic of the mutual conductance obtained from a result of measurement of the MOSFET, wherein the gate, the source, and the drain of the MOSFET are being applied a DC voltage.

21 A circuit design system according to claim 20, wherein the MOSFET is a SOI MOSFET having a SOI (Silicon On Insulator) structure.

22 A circuit design system according to claim 20, wherein the parameter is at least one of capacitances and resistors between a body of the MOSFET and the gate · source · drain · substrate.

23 A circuit design system according to claim 20, wherein the function block for superimposing the AC input signal superimposes the AC input signal to the gate under a condition of applying the DC voltage to the substrate as well as the gate, the source, and the drain.

24 A circuit design system, comprising:

a function block for superimposing an AC input signal to a drain of a SOI (Silicon On Insulator) MOSFET (Metal Oxide Semiconductor Field Effect Transistor);

a function block for measuring an AC component of a current flowing between a source and a drain of the SOI MOSFET when the AC input signal is superimposed to the drain;

a function block for calculating a drain conductance at a frequency of the AC input signal of the SOI MOSFET from a ratio of amplitude of an AC component of the measured current and amplitude of the AC input signal;

a function block for comparing a gate · source · drain voltage dependency of a frequency characteristic of the drain conductance obtained as a result of measurement of the MOSFET with a gate · source · drain voltage dependency of a frequency characteristic of the drain conductance obtained by circuit simulation for simulating the SOI MOSFET; and

a function block for changing a parameter which is used for the circuit simulation so that a frequency characteristic of the drain conductance obtained as a result of the circuit simulation approaches to a frequency characteristic of the drain conductance obtained from a result of measurement of the MOSFET, wherein the gate, the source, and the drain of the SOI MOSFET are being applied a DC voltage.

25 A circuit design system according to claim 24, wherein the parameter is at least one of capacitances and resistors between a body of the SOI MOSFET and the gate・source・drain・substrate.

26 A circuit design system according to claim 24, wherein the function block for superimposing the AC input signal superimposes the AC input signal to the gate under a condition of applying the DC voltage to the substrate as well as the gate, the source, and the drain.